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TRANSACTIONS

OF THE

ILLUMINATING ENGINEERING SOCIETY

FOUNDED IN LONDON 1909 INCORPORATED 1930

CONTENTS

	Page
Notes on Recent Meetings and Events	160
Synopsis of Meetings	161
Exhibits at the Opening Meeting	162
Applications for Membership	163
A Scale for Plotting Intensity Distribution of Street Lighting Lanterns, by J. M. Waldram, B.Sc., F.Inst.P.	165
Recommended Values of Illumination (Second Version, Revised)	167

VOLUME III—No. 11
NOVEMBER, 1938

32 VICTORIA STREET
LONDON SW1

NOTES ON RECENT MEETINGS AND EVENTS

General Meetings in London.

The opening meeting in London took place at the E.L.M.A. Lighting Service Bureau (2, Savoy-hill, London, W.C.2) on October 11. As usual, members and friends were afforded a preliminary view of the exhibits illustrating progress in Illumination and Photometry at 4.30 p.m.

At the subsequent meeting, which commenced at 6.30 p.m., Dr. S. English explained that he had been asked to preside in view of the absence of the president (Mr. Percy Good) in New Zealand on a special mission. The minutes of the last meeting were taken as read.

The usual awards were then made. Mr. J. W. Ryde received the "Leon Gaster Memorial Premium" for his paper entitled "Luminescent Materials and their Application to Light Sources," read at the meeting of the society on April 12, 1938, and Mr. H. J. A. Turner received the Silver Jubilee Commemoration (1934) Award for his contribution entitled "The Applications of Electric Discharge Lamps to Photometry."

Brief descriptions and demonstrations were then given of the chief exhibits, a list of which appears on pp. 162-3. It will be noted that the number of exhibits (thirty) was as great as on similar occasions in the past and that a considerable variety of lighting equipment, apparatus, and instruments was again on view.

After the hon. secretary made the usual announcements, and attention had been drawn to the list of applicants for membership, presented (see p. 163), a vote of thanks to the exhibitors and to the E.L.M.A. Lighting Service Bureau for their hospitality terminated the proceedings.

The second general meeting of the session was held in the Lecture Theatre of the Institution of Mechanical Engineers (Storey's-gate, St. James's Park, London, S.W.1) on Tuesday, November 8. The chair was taken by the acting president (Dr. S. English).

The minutes of the last meeting having been taken as read, the hon. secretary mentioned that lists of new applicants for membership was available for inspection, and those whose names had been presented at the previous meeting were formally declared members of the society (see p. 164).

The following three papers were then presented: "The Revealing Power of Street Lighting Installations" (Mr. J. M. Waldram), "Necessary Values of Brightness Contrast in Artificially Lighted Streets" (Mr. C. Dunbar), and "Reflection Factor Revealing Power" (Mr. F. C. Smith). The papers were illustrated by lantern slides and demonstrations, and, on the motion of the president, a vote of thanks was accorded to the authors. After Dr. English had made a few remarks from the chair, the discussion was opened by Dr. C. C. Paterson. Others who took part were Mr. J. Sandeman, Mr. L. T. Minchin, Dr. J. W. T. Walsh, Mr. R. G. Hopkinson, Mr. E. S. Perrin, Mr. J. S. Dow, Mr. J. S. Preston, and Mr. A. Cunnington.

Sectional Meetings in London.

Industrial Lighting Section.

At a meeting on October 17, held in the Lecture Theatre of the Junior Institution of Engineers, Mr. W. Robinson gave an address on "Lighting Faults," in the course of which instructive examples of insufficiency of light, glare, and inconvenient shadows were given. The author emphasised the importance of providing adequate lighting in corridors and on staircases, as well as over the actual working area, and the drawbacks of local lighting without sufficient supplementary general lighting in the room, giving rise to excessive contrast. In regard to glare, a definite relation between the mounting height and the output of sources in lumens when the working illumination exceeded fifteen foot-candles was advocated. Mr. R. O. Ackerley, chairman of the section, presided.

Public Lighting Section.

Mr. F. C. Smith presided over a meeting of this section, held at the E.L.M.A. Lighting Service Bureau on October 21, when contributors were presented by Mr. J. G. Christopher, Mr. F. K. Garry, Mr. K. F. Sawyer, and Mr. L. M. Tye on "The Siting of Street Lighting Installations." All four contributors illustrated, by the aid of plans, their ideas of how lighting sources should be located on two stretches of roadway, specially selected in view of the special problems (multiple cross-roads, roundabouts, etc.), presented. The meeting illustrated very aptly the special field of the section in facilitating discussions on details of public lighting technique.

Commercial Lighting Section.

The opening meeting of this section, held at the E.L.M.A. Lighting Service Bureau on October 27, attracted an excellent audience. The address of Mr. H. Lingard on "Commercial Lighting Practice in the United States" was illustrated by numerous lantern slides, and dealt more especially with the higher standards of illumination, 30-50 ft.-c., customary in American stores and offices. Attention was drawn to the general use of indirect lighting and louvred fittings with a view to eliminating glare. The discussion was opened by Mr. W. A. Sherrington, who, as an architect concerned with the lighting of large stores, expressed much interest in Mr. Lingard's paper. Mr. W. J. Jones, chairman of the section, presided.

Decorative Lighting Section.

A meeting was held at the Besant Hall on October 25. In the unavoidable absence of the author, Mr. A. B. Read, the paper entitled "What is the Trend of Decorative Lighting, and is it Desirable?" was read by Mr. H. T. Moss. The paper, which was illustrated by numerous lantern slides, reviewed progress in lighting fittings in relation to decorative effect, and gave rise to a keen discussion. Mr. R. O. Sutherland presided.

Meetings of Local Centres.

North Midland Local Centre.

The second meeting of the session of the North Midland Area Local Centre was held on Monday, October 10, at the Electricity Showrooms, Leeds. In the absence of Mr. H. W. Sellers, Mr. Pogson, deputy-chairman, presided, and in his preliminary remarks stated that the centre had grown to one hundred members in the course of a year. He also drew attention to a series of twelve lectures to be held at the Leeds College of Technology on Lighting, commencing in the new year.

Mr. E. W. Murray, A.M.I.E.E., H.M. Eng. Inspector of Factories, then delivered his address on "Factory Lighting and Accident Prevention," which was fully appreciated by all present. The speaker first dealt with possible reasons why there should be an excess of accidents in winter over summer, and passed to the 1937 Factory Act, which demands adequate lighting in all works and passages. He suggested simple means whereby illumination could be maintained at the desired standard. Mr. Murray also discussed the influence of lighting on the output and health of workers, and illustrated modern methods of installing and maintaining suitable illumination.

After a vote of thanks had been accorded to Mr. Murray for his paper, the chairman, before closing the meeting, reminded all members of the dinner dance to be held in Powolnys, Leeds, on November 18.

Midland Local Centre.

The opening meeting of this newly-formed local centre which took place at the White Horse Hotel, Congreve-street, Birmingham, on October 21, was a very successful one. Mr. Howard Long, chairman of the Centre, presided. In the absence of Dr. S. English, Mr. E. Stroud delivered the opening address, which consisted in part of a review of the development of the Illuminating Engineering Society and the work of the local Centres, and in part of a survey of recent events in connection with lighting, such as the M.O.T. Street Lighting Report, the forthcoming report of the Home Committee on Factory Lighting, etc. Mr. Stroud recalled that there were now in existence five Local Centres and five Special Sections, which held regular meetings, in addition to the General Meetings in London. He congratulated the Midland Local Centre on the encouraging growth of its membership and the interesting programme arranged for its first session. The Council felt that the continued progress of local centres was of great importance, and was anxious to aid them in every possible way.

Following Mr. Stroud's address, there was an interesting series of exhibits, for which the following firms were responsible: Benjamin Electric, Ltd. (Mr. Harvey); British Thomson-Houston Company, Ltd. (Mr. Hubble); Edison Swan Electric Company, Ltd. (Mr. Gibbs); Falk, Stadelmann and Company, Ltd. (Mr. Stenning); General Electric Company, Ltd. (Mr. Alldridge); Holophane, Ltd. (Mr. Stroud); Revo Electric, Ltd. (Mr. Hartill); Rowlands Electrical Accessories, Ltd. (Mr. Sayers); Siemens Electric Lamps and Supplies, Ltd. (Mr. Varcoe); Simplex Electric Company, Ltd. (Mr. Hunt); Verity's, Ltd. (Mr. Field).

Some discussion followed, after which votes of thanks were accorded to Mr. Stroud for his address and to the various Exhibitors.

Local Centre for Scotland.

At its opening meeting held at "The Gordons," Glasgow, on October 19, the Local Centre for Scotland received an address from Mr. R. O. Ackerley, who opened a discussion on "Lessons to be Gained from the Lighting of the Empire Exhibition, Glasgow." After conveying the good wishes of the President and Council for a successful year, Mr. Ackerley discussed the lighting of the Exhibition, explaining how due regard had to be paid to its objects in determining the extent of the lighting and the expenditure. Mr. Ackerley discussed in turn the chief features of the lighting, alluding to the treatment of the Tait Tower, the fountains, etc. He mentioned the United Kingdom Pavilion as the outstanding example of interior lighting. The discussion was carried on by Mr. H. de Weerdt and by Mr. M. W. Hime, Mr. S. Kates, Mr. J. Gogan, Mr. D. G. Lindsay, and Mr. E. J. Stewart. After Mr. Ackerley had briefly replied to the points raised by the various speakers, he was accorded a cordial vote of thanks for initiating what had proved to be a very enjoyable evening.

Local Centre for the Irish Free State.

The first meeting of the session was held in the Engineers' Hall, Dublin, on October 18, when an interesting lecture on "The Physics of Light" was delivered by Dr. H. H. Poole. Mr. G. Davidson presided.

SYNOPSIS OF MEETINGS

N.B. *Unless otherwise announced all meetings commence at 7 p.m.*

LONDON.

Nov. 22nd. Problems Evening (A. Mansell, A. W. Beuttell, and G. Lovell); *Gas Industry House, 1, Grosvenor Place, Westminster, S.W.1.*

Nov. 29th. Outdoor Photometry; *Junior Institution of Engineers, 39, Victoria Street, S.W.1.*

Dec. 7th. Lighting of the Glasgow Exhibition (R. O. Ackerley and A. Mansell); *Gas Industry House, 1, Grosvenor Place, Westminster, S.W.1.*

Dec. 9th. Visit to Street Lighting Installations (Hackney, Hornsey and Paddington).

Dec. 13th. The Response of the Eye to Light in Relations to the Measurement of Subjective Brightness and Contrast (Dr. W. D. Wright); *Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W.1.*

Dec. 19th. Light in Relation to Production (T. E. Catten); *E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C.2.*

MANCHESTER.

Dec. 14th. Lighting in the Cotton Industry; *Electricity Showrooms, Rochdale.*

LEEDS.

Dec. 12th. Revealing Power of Street Lighting Installations (F. C. Smith, C. Dunbar and J. M. Waldram); *Electricity Showrooms, The Headrow.*

BIRMINGHAM.

Dec. 2nd. Glass Manufacture (W. M. Hampton): *White Horse Hotel, Congreve Street.*

GLASGOW.

Dec. 21st. Some Aspects of Gas Lighting; "*The Gordons,*" *19, Gordon Street.* **(7.30 p.m.)**

SUMMARY OF EXHIBITS

On view at the Opening Meeting held at the E.L.M.A. Lighting Service Bureau (2, Savoy Hill, London, W.C.2), on Tuesday, October 11th, 1938.

	SUBJECT OF DEMONSTRATION.	EXHIBITORS.
1.	New features at the Bureau.	ELMA LIGHTING SERVICE BUREAU (*Mr. H. Lingard.*)
2.	Fluorescent Tube Lighting at Malden Manor Station.	*Mr. A. Cunnington.*
3.	New Methods of Lighting Underground Railway Coaches.	THE BENJAMIN ELECTRIC, LTD. (*Mr. W. Imrie-Smith*).
4.	A Form of Shop front Illumination demonstrating the use of Coloured Surfaces of light as an alternative to lines or points of light, incorporating Thermolux Glass.	THE THERMOLUX GLASS COMPANY (*Mr. E. G. Elton*).
5.	(a) A New Multi-Range Portable Photoelectric Photometer. (b) A Photoelectric Brightness Meter. (c) A Long Range Distribution Photometer	RESEARCH LABORATORIES OF THE GENERAL ELECTRIC COMPANY, LTD. (WEMBLEY). (*Mr. G. H. Wilson*).
6.	A Light-Actuated Gas Lamp Controller.	SOUTH METROPOLITAN GAS COMPANY (*Mr. W. B. H. Hall*).
7.	An Automatic Safety Cut-Off Valve for Gas Illuminated Guard Posts.	GAS LIGHT AND COKE COMPANY (*Mr. A. F. Hedges*).
8.	Sugg-Horstmann "Comet" Remote Control System—A New Pattern Gas Industrial Lighting Fitting.	WM. SUGG & CO. LTD. (*Mr. P. C. Sugg and Mr. A. R. McGibbon*).
9.	Fluorescent Lamps—Housing for Water-cooled lamps and chokes and condensers—Aerodrome Landing Field Projector—Demonstration of Fluorescent Wall Paper—Philips Visibility Meter.	PHILIPS LAMPS, LTD. (*Mr. R. P. Sayers*).
10.	A Compact 500W Light Source—Aero Floodlighting lamp—Floodlighting Unit.	SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD. (*Mr. J. E. Lane*).
11.	Demonstration of Picture Lighting and New Methods of Lighting Surfaces.	*Mr. Robert R. Hoare, R.N.*
12.	Ali-Tal Aluminium Reflectors and other Lighting Equipment.	THE BENJAMIN ELECTRIC, LTD. (*Mr. W. Imrie-Smith*).
13.	A Brightness Meter and Variable Sensitometer.	THE BRITISH THOMSON-HOUSTON COMPANY, LTD. (*Mr. R. Maxted*).
14.	(a) A Picture Lighting Projector. (b) A Lighting Fitting Incorporating Neon Pilot Lamp. (c) A Novel Means of Illuminating a Plaster Niche.	*Mr. Harold Bright.*
15.	Shop-window Reflectors for combined Filament and Discharge Lamps—Combination Fitting for Hospital Ward—New Type of Dental Fitting—Garage Pit Fitting.	THE GENERAL ELECTRIC COMPANY, LTD. (*Mr. S. Anderson*).
16.	Lantern for Horizontal Burning Mercury Discharge Lamps embodying a special cylindrical Reflector—Street Lighting ("Dublin") Lantern.	HOLOPHANE, LTD. (*Mr. E. Stroud*).
17.	Automatic Colour-changing Floodlight Projector—New Street Lighting Lantern—Underwater Flood Light Projector.	THE EDISON SWAN ELECTRIC COMPANY, LTD. (*Mr. A. Mansell and Mr. F. M. Cocksedge*).
18.	Three New Types of Lanterns—Demonstration of Curved Prisms—Chokes—2-k.W. Studio Unit.	THE GENERAL ELECTRIC COMPANY, LTD. (*Mr. D. A. Hart and Mr. G. S. Barrett*).
19.	Fluorescent Tubing and Neon Letters.	PEARCE SIGNS, LTD. (*Mr. R. T. Jones*).
20.	A Combined Lighting and Ventilating Unit.	*Mr. B. F. W. Besemer.*
21.	Display of Sieray Ultra-Violet Fluorescent Irradiation.	SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD. (*Mr. C. R. Bicknell*).

SUMMARY OF EXHIBITS

SUBJECT OF DEMONSTRATION.	EXHIBITORS.
22. Prismatic Bulk-Head Units and Other Special Fittings.	SIMPLEX ELECTRIC COMPANY, LTD. (*Mr. H. S. Allpress*).
23. Time Switches—Lightometer—Illumination Meter—Photronic Cell.	SANGAMO WESTON, LTD.
24. A Gaslight Wall Fitting.	WM. EDGAR & SON, LTD.
25. New Types of Gaslighting Pendants.	FALK STADELMANN & CO., LTD.
26. Universal (Kingsland) Clock Controller and the "Brimax" Gas Street Lamp.	THE GAS METER COMPANY, LTD. and W. PARKINSON & CO. (*Mr. Philpot*).
27. The General Lighting Information Service.	*Mr. H. Juliusburger.*

Applications for Membership.

Elections Completed.

At the general meeting of the Society, held on November 8, 1938, the names of the following applicants, recorded at the previous meeting on October 11, were again presented, and these applicants were formally declared members of the Society:—

CORPORATE MEMBERS:—

Assersohn, J. .....31 and 33, St. Bride Street, LONDON, E.C.4.
Balmain, D. .....Dundonald, Whickham Highways, DUNSTON-ON-TYNE.
Bremner, J. R. .....92, Vivian Avenue, Wembley, MIDDX.
Christelow, L. J. .....17, Roxeth Green Avenue, S. Harrow, MIDDX.
Corcoran, N. .....18, Oak Avenue, Romily, Stockport, CHESHIRE.
Edinborough, E. R. ...The British Thomson-Houston Company, Ltd., Crown House, Aldwych, LONDON, W.C.2.
Garner, G. B. .....48, Lake Rise, Romford, ESSEX.
Griffiths, W. F.....188, Poplar Road, Merton Park, S.W.
Hedges, A. F.....53, St. Mary's Road, Watford, HERTS.
Hoare, Robert R. .....United Service Club, Pall Pall, S.W.1.
Hodkinson, W. .....Fairholme, Moss Lane, SALE.
Hogg, D. R. .....18, Croham Valley Road, SOUTH CROYDON.
Hubble, L. H. .....2, Hilltop Way, Stanmore, MIDDX.
Hunter, N.....Electricity Offices, Morley, YORKS.
Latcham, H. J. .....Kodak, Ltd., Kodak House, Kingsway, W.C.2.
Mitchell, J. M. A.....Newcastle - upon - Tyne and Gateshead Gas Company, 30, Grainger Street, NEWCASTLE-UPON-TYNE.
Moore-Gledhill, P. ...Water and Gas Department, FILEY.
Norden, K. .....54, Cambridge Terrace, LONDON, W.2.
Smyth, V. L. W. .....Union Lamp and Lighting Company, Abbeydale Road, Wembley, MIDDX.
Stevens, G. H. .....91, Osidge Lane, LONDON, N.14.

COUNTRY MEMBERS:—

Berry, E. H. .....South African Electric Lamp Association, 19, Harrison Street, Johannesburg, SOUTH AFRICA.
Boagey, C. W. .....104, South Woodside Road, GLASGOW.
Burke, R. G. .....1, Birchwood Terrace, Ballinclea Road, Killiney, COUNTY DUBLIN.
Briebach, R. E. P. ...Nornoc, Layton Avenue, Rawdon, LEEDS.
Cater, J. F. .....85, Kingston Road, Willerby, HULL.
Chapman, F. E. .....133, Rough Road, Erdington, BIRMINGHAM.
Galton, C. W. .....Heather Lodge, Sutton, COUNTY DUBLIN.
Gibbs, L. E. .....Beechdale, Manor Lane, Quinton, BIRMINGHAM.
Forth, J. W. .....137, Corporation Road, DUDLEY.
King, W. P. .....82, Botanic Avenue, Drumcondra, DUBLIN.
Krivor, M. G. .....General Electric Company (China), Ltd., Queens Buildings, HONG KONG.
Liller, H. .....134, Scarthoe Road, Grimsby, LINCS.
McGinley, A.....108, Drumcondra Road, DUBLIN.
Marson, G. .....5, Hales Street, COVENTRY.
McDermott, B. .....15, Windsor Avenue, Fairview, DUBLIN.
McEniery, R. A. .....107, Shelly Beach Road, Herne Bay, Auckland, NEW ZEALAND.
Meadows, L. .....Metropolitan Vickers Electrical Company, Ltd., 74, Waterloo Street, GLASGOW.
Parker, G. E. .....175, Clarence Street, Sydney, NEW SOUTH WALES.
Rigg, J. H. .....22, Drummond Avenue, LEEDS 6.
Smith, P. E. .....21, Ruthven Avenue, Giffnock, RENFREWSHIRE.
Walton, C. .....65, Stainburn Crescent, LEEDS 7.

ASSOCIATES:—

Jones, W. H. .....103, Ruskin Road, NORTHAMPTON.
Montgomery, R. .....380, Bourke Road, Melbourne, AUSTRALIA.

Elections Completed.

AFFILIATED STUDENTS:—

Aish, N. C. R. .....32, St. Albans Avenue, BOURNEMOUTH.
Walters, D. H. .....66, Jerningham Road, NEW CROSS, S.E.14.

At the previous meeting on October 11, 1938, the names of those announced on May 10, 1938, which were published in the issue of the *Transactions* (Vol. III., No. 6, June, 1938, p. 86) were presented again, and these applicants were also formally declared members.

Elections Pending.

At the general meeting of the Society held on November 8, the following names of the following applicants for membership were presented for the first time:—

SUSTAINING MEMBERS:—

Harcourts, Ltd. .....Stanhope House, 1, Kean Street, Aldwych, LONDON, W.C.2.
Representative .....Mr. F. W. Leevers.
Heyes and Co., Ltd....Water-Heyes Electrical Works, Wigan, LANCS.
Representative .....Mr. A. V. Heyes.

CORPORATE MEMBERS:—

Cook, E. G. .....60, Selly Oak Road, BOURNEVILLE.
Dennis, R. A. .....36, Crummock Gardens, Kingsbury, LONDON, N.W.9.
Hackman, A. S. .....8, Butler Road, S. Yardley, BIRMINGHAM.
Kilner, J. T. .....Town Hall, Prestwich, MANCHESTER.
Saunders, E. A.....13, St. John's Hill Grove, BATTERSEA, S.W.
Yearsley, F. R. .....Bell Phona, New Way, Tranmere Park, Guiseley, nr. LEEDS.

COUNTRY MEMBERS:—

Aldred, F. .....17, Devon Avenue, Fleetwood, LANCS.
Bate, F. .....Rookery, Cot Lane, Wordsley, nr. STOURBRIDGE.
Batt, S. G. .....General Electric Company, Ltd., 8, George Street, EDINBURGH.
Burgin, W. E. .....Pipers Wood, Halton Hall, Halton, LANCS.
Button, C. J. .....8, Pearse Street, Dublin I.F.S.
Davies, J. H. .....8, Pearse Street, Dublin, I.F.S.
Freemantle, I. S. .....39, Kingscote Road, Edgbaston, BIRMINGHAM.
Gearing, O. .....9, Oxford Road, Moseley, BIRMINGHAM.
Gibbs, L. E. .....Beechdale, Manor Lane, Quinton, nr. BIRMINGHAM.
Lewin, D. .....10, Petersfield Court, Hall Green, BIRMINGHAM.
Liversage, J. S. .....39, Aubrey Avenue, Llandaff, CARDIFF.
Metcalf, E. .....Haulfre, Wynyard Close, Sale, CHESHIRE.
Oakley, J. E. .....107, Highfield Road, BIRMINGHAM.
O'Donnell, B. .....32, Clareville Road, Harolds Cross, DUBLIN.
Powell, F. .....74, Tetley Road, Hall Green, BIRMINGHAM.
Pimm, E. A. .....25, Acheson Road, Hall Green, BIRMINGHAM.
Sayers, R. W. .....11, Silver Birch Road, Erdington, BIRMINGHAM.
Tyldesley, E. .....Cryselco, Ltd., 11, Albert Square, MANCHESTER.
Wackrow, V. C. .....12, Glas Teilo, Whitchurch, CARDIFF.

ASSOCIATES:—

Bagnall, T. V. .....32, Woodlands Park Road, King's Norton, BIRMINGHAM.
Farrer, M. .....42, York Street, Twickenham, MIDDX.
Hill, J. .....8, Mirfield Road, Solihull, BIRMINGHAM.
Lloyd, P. M. .....Deringham, Kingswinford, S. STAFFS.
Norris, F. W. .....Kenmuir, Little Moor Hill, SMETHWICK.
Watkin, N. G. .....37, Walsall Road, Four Oaks, nr. BIRMINGHAM.
Woolfenden, D. G. ...12, Evesham Road, Narborough, LEICESTER.

AFFILIATED STUDENTS:—

Sherwood, A. H. W....239, Village Way, Beckenham, KENT.
Stephenson, H. F. ...129, Fairfield Crescent, Edgware, MIDDX.
Reed, D. J. .....106, Wickham Road, LONDON, S.E.4.

AWARDS FOR PAPERS

Members are reminded that offers of papers or shorter contributions may be made at any time to the Hon. Secretary. Contributions may be of a descriptive or statistical nature, but those embodying the results or original research are specially welcome.

Two awards are made.

The Leon Gaster Memorial Premium, established in 1930, which may be received by any person of either sex or of any nationality, consists of ten guineas and a certificate recording the award. It is awarded annually by the Council for the best contribution submitted to and published by the Illuminating Engineering Society during the session.

The Silver Jubilee Commemoration (1934) Award, which is available annually for a member, associate, or affiliated student of the Society, who is under the age of twenty-six years on the date of his qualification for the award, consists of five guineas and a certificate recording the award. The qualification is the accomplishment of any of the following tasks: (1) The presentation in writing to any Technical Society or Association approved by the President, of a paper dealing with the theory or practice of illuminating engineering, or (2) the design and or construction of a novel instrument or appliance for use in connection with any application of or research concerning illuminations, (3) the carrying out by the applicant of an investigation beneficial to illuminating engineering. Applications for this award, accompanied by copies of papers read, records of researches or other evidence, should be lodged with the Hon. Secretary before June 30, 1939.

A SCALE FOR PLOTTING INTENSITY DISTRIBUTION OF STREET LIGHTING LANTERNS

By J. M. WALDRAM, B.Sc., F.Inst.P. *(Member.)*

(Communicated.)

The distribution of intensity from a street lighting unit is generally plotted on polar co-ordinates or on a sinusoidal web. Neither diagram enables a very clear estimate to be formed of the usefulness of the distribution or of the appearance of the road which will result. The sinusoidal isocandle diagram has the advantage of recording a great deal of data on a single sheet, but it is almost impossible to interpret by inspection without drawing curves on polar or cartesian co-ordinates from the data which it gives. The usefulness of the isocandle diagram would be increased if there were a standardised series of candle intervals at which contours are always drawn. Unless the intervals are drawn at some consistent series of intensity levels the diagram can be most misleading. Even the familiar polar curve fails to draw attention to differences in distribution which are most apparent on the street. Fig. 1 shows three polar distributions which give markedly different appearances on the

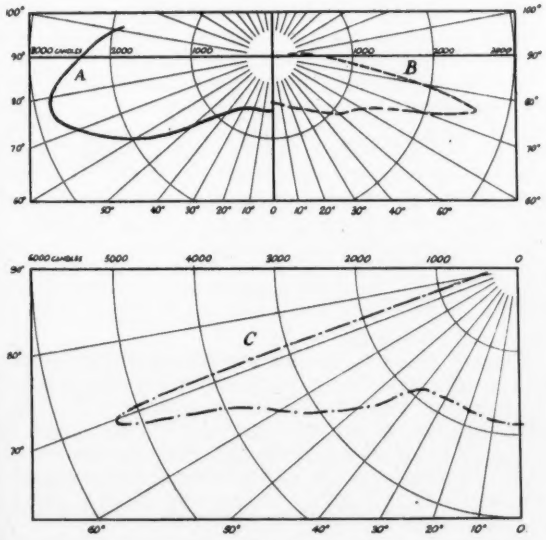

Fig. 1.

road, and Fig. 2 gives a typical unintelligible isocandle diagram. Both diagrams have a uniform scale of angles, whereas in practice in street lighting certain regions of the distribution are of much greater importance than others. The appearance of the road is governed by the shape of the bright area formed by each source on the road surface, and the main range of this bright area is formed by an extremely small region in the polar distribution.* On Figs. 3 and 4, which show the bright areas from two sources 200 ft. and 300 ft. away, scales have been added showing the

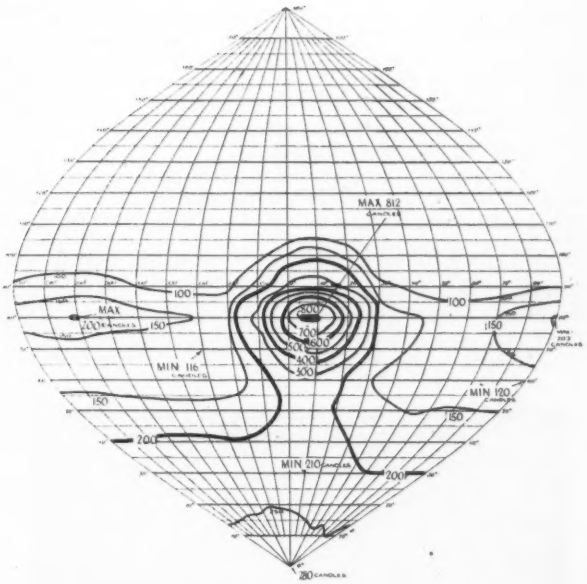

Fig. 2.

Fig. 3.

* J. M. Waldram, Ill. Engineer, 1934, p. 307.

angles from the vertical at which light leaves the lantern to reach the road at various points. It will be seen that the greater part of the polar distribution is taken up with the formation of a very small part of the bright region on the road. The part of the road lighted by light from 0° to 60° to the vertical is cramped by perspective into insignificance, whereas the part from 70° to 85° occupies the greater part of the field of view. The particular region of the distribution varies with the distance of the source and the height, but for the (non-cut-off) sources which contribute most to the appearance of the installation, the light emitted from 68° to 87° is the most important.

It is interesting to plot the distribution on cartesian co-ordinates using a scale of angles similar to the scales shown in Figs. 3 and 4, which are so computed that equal distances along the scale represent equal distances measured vertically in a perspective view. The form of the scale varies with the distance, but 300 ft. is a convenient distance for a source mounted at 25 ft., for the scale is not too cramped, and yet the source is far enough away to be important in determining the appearance of the road. The polar distributions of Fig. 1 are replotted on this scale in Fig. 5*, when the important differences between them can at once be seen. Curve A gives in practice a long, wide, bright area for normal siting. Curve B gives a bright area which is curtailed, and is suited to short spacings or opposite mounting. Curve C is a cut-off distribution giving a bright area which has no "tail" but which is a band running across the road. All these characteristics can be seen at once on the curves of Fig. 5. In this figure the scale of abscissae corresponds to a uniform scale drawn vertically on a perspective view, the horizon corresponding to the left-hand end of the scale.

Fig. 4.

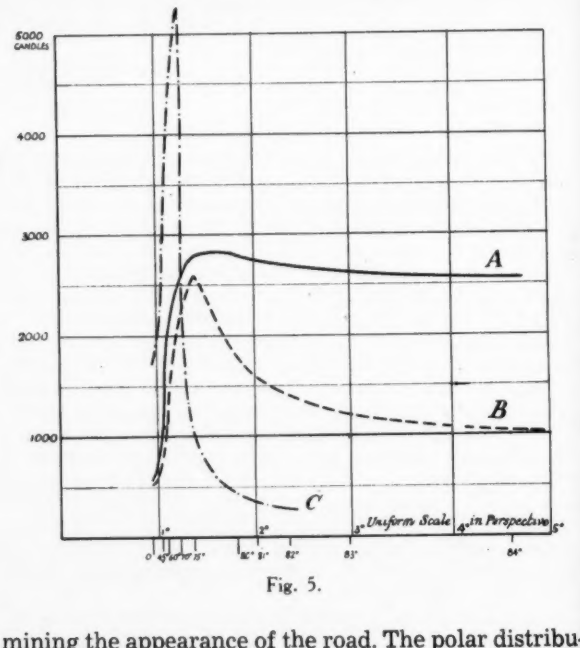

Fig. 5.

Though this diagram takes no account of road reflection characteristics, and cannot therefore directly indicate the road brightnesses which will occur, it simplifies the appraisal of polar distribution by taking account of perspective distortion and more correctly emphasising the importance of various parts of the distribution than do the conventional diagrams.

*The scale shown in Fig. 9 can be obtained from Fig. 11, Ill. Eng., October, 1934, p. 310, or from the formula $\tan d = \frac{D - H \tan \theta}{h}$ where d is the angle in perspective, D the distance of the light source from the observer, H the mounting height, and h the observer's height (5 ft.).

Extension of Corporate Membership.

In the course of the general meeting on November 8 the honorary secretary announced that the total number of corporate members in the society had now attained 500, the number for which the society was incorporated in 1930. The council had accordingly passed a resolution approving the extension of this number to 1,000, and, in accordance with the regulations for incorporated societies this increase would be duly recorded with the Registrar of Companies.

RECOMMENDED VALUES OF ILLUMINATION

(Second Version, Revised)

November, 1938

The following "Recommended Values of Illumination" constitute a further revised version of the original values, prepared by the Technical Committee and issued by the Illuminating Engineering Society in March, 1936, as an indication of good modern practice and revised in August, 1938. The chief feature of the present edition is the modification of certain of the ranges of illumination in order to avoid overlapping.

(a) This code gives **Recommended Illumination Values** on the working plane for various classes of work based upon good modern practice.

It is recognised that these recommendations will require revision from time to time in order to take cognisance of new investigations and changes in practice.

(b) **Service Values of Average Illumination.**

The values given are *Service Values of Average Illumination within* the area over which the visual task is carried out.

Where there is no definite area of work the illumination values are assumed to be available on a horizontal plane 2 ft. 9 in. from the floor .

The illuminating engineer must make allowances for depreciation. In practice the *Initial Values of Illumination should be higher than the service values it is desired to provide.*

(c) **Supplementary Local Lighting.**

The higher values may be obtained by supplementing the general lighting with local lighting, but the method of providing these illumination values is not specified, as this is a matter for the judgment of the illuminating engineer.

(d) **Uniformity of Illumination.**

These recommended values assume that there will not be undue variation in the values of illumination over the working area. In general it is considered that *no point of the working area shall be illuminated to less than 70 per cent. of the maximum.*

(e) **General Classification of Visual Tasks.**

Accompanying the code is a general classification of visual tasks together with the recommended illumination for adequate seeing conditions.

This classification forms the basis for the allocation of illumination values given in the table of specific tasks and in the case of visual tasks outside those enumerated provides a means of estimating the illumination required.

Present knowledge relating to seeing does not permit a precise statement of the illumination required for any visual task to be given, and ranges of illumination consistent with present good practice have accordingly been recommended.

These values are not regarded as complete, and will naturally need amplification from time to time as new knowledge is acquired in regard to the needs of certain processes or industries.

Furthermore, detailed researches in special fields of lighting, such as those involved in the inquiry conducted by the Society into the Lighting of Schools, may occasionally lead to the adoption of values which do not fall precisely within the ranges of this General Classification. Due regard will be paid to such circumstances when further revision is undertaken.

(f) **Colour Correction.**

Instances also arise in which the colour of the light as well as the provision of adequate illumination is an important condition.

VALUES OF ILLUMINATION RECOMMENDED FOR VARIOUS TASKS.

	Recommended Foot-candle Value.	Class of Task.
1.	**Above 50**	Precision work to a high degree of accuracy; tasks requiring rapid discrimination; displays.
2.	**25—50**	Severe and prolonged visual tasks, such as fine engraving; discrimination or inspection of fine details of low contrast.
3.	**15—25**	Prolonged critical visual tasks, such as drawing, fine assembling, fine machine work, proof reading, sewing on dark goods, and type-setting.
4.	**10—15**	Visual tasks such as skilled bench-work, sustained reading and sewing on light goods.
5.	**6—10**	Less exacting visual tasks, such as casual reading and large assembly work.
6.	**4— 6**	Work of simple character not involving close attention to fine detail.
7.	**2— 4**	Casual observation where no specific work is performed.

RECOMMENDED ILLUMINATION VALUES

GENERAL.

	Foot-candles
Art Studios	**Special Lighting**
Cinemas	**Special Lighting**
Dance Halls	**Special Lighting**
Dentists' Surgeries	
Surgeries (chair)	25—50
Waiting rooms	6—10
Homes	
Bathrooms:—	
General	6—10
Mirrors	**Special Lighting**
Bedrooms:—	
Beds and mirrors	**Special Lighting**
General	4—6
Kitchens:—	
Cookers, sinks, and tables	6—10
Nurseries	6—10
Reading—casual	6—10
Reading—sustained	10—15
Sewing	15—25
Students' homework	10—15
Table games	6—10
Workbenches	10—15
Hospitals	
Beds	**Special Lighting**
Corridors and stairways	2—4
Laboratories	15—25
Operating Rooms	15—25
Operating tables*	100—500
Private rooms and wards	2—4
Receiving and waiting rooms	6—10
Hotels	
Bakeries	6—10
Bedrooms:—	
Beds and mirrors	**Special Lighting**
General	6—10
Corridors and stairways	2—4
Dining rooms and lounges	6—10
Writing rooms:—	
General	6—10
Tables	**Special Lighting**
Office Buildings	
Book-keeping and typing rooms	10—15
Cashier's counters	10—15
Corridors and staircases	2—4
Drawing offices	25—50
Enquiry offices, filing rooms, reception rooms, waiting rooms	6—10
General offices	8—12
Other offices	10—15
Public Buildings	
Churches:—	
Altars, chancels, choirs	6—10
Church halls	6—10
Interiors	4—6
Libraries:—	
Backs of books	2—4
Book rooms	6—10
Corridors and stairways	2—4
Reading room	6—10
Reading tables	10—15
Museums:—	
Corridors and stairways	2—4
General interiors	6—10
Showcases	**Special Lighting**
Public Halls:—	
Corridors and stairways	2—4
General interiors	6—10
Schools*	
Art and drawing rooms	15—25
Classrooms, libraries, and offices	6—10
Corridors and stairways	2—4
Dressing rooms, toilet, and wash rooms	6—10
Gymnasiums	6—10
Laboratories	10—15
Lecture theatres	6—10
Manual training rooms	10—15
Sewing rooms	15—25
Shops (including Restaurants and Stores)	
Automobile showrooms	**Special Lighting**
Bakeries	6—10
Corridors and stairways	2—4
Dressing rooms, toilet and wash rooms	6—10
Large departmental stores	15—25
Refreshment rooms	6—10
Restaurants	6—10
Shop Interiors	10—15
Shop Windows	**Special Lighting**
Sports (including Indoor Recreations)	
Badminton, indoor cricket, indoor tennis, racquets, and squash	**Special Lighting**
Billiards:—	
General	2—4
Tables	15—25
Bowling, on alleys and runways	10—15
Gymnasiums	6—10
Skating rinks	6—10
Theatres	**Special Lighting**

* Installations where artificial daylight may be useful.

* See also I.E.S. Report on School Lighting.

INDUSTRIAL

	Foot-candles
Assembly Shops	
Extra fine work	25—50
Fine work	15—25
Medium work	10—15
Rough work	6—10
Book-Binding	
Assembling, cutting, embossing, folding, pasting, punching, and stitching	10—15
Burnishing and Polishing	10—15
Cements and Clay	
Cleaning and lumming, colouring and glazing, enamelling, moulding and pressing	10—15
Filter pressing, grinding and kiln rooms	6—10
Cloth Cutting, Inspecting, and Sewing	
Dark goods	15—25
Light goods	10—15

	Foot-candles
Coal Breaking	
Control point and picking belts ...	15—25
Screening and washing	2—4
Die Making	25—50
Drawing Offices	25—50
Engraving	above 50
Flour Milling	
Baking, cleaning, grinding, roasting, and rolling	6—10
Foundries	
Charging the-cupola, cleaning, pouring shaking out, and tumbling	6—10
Fine core making and fine moulding ...	10—15
Rough core making and rough moulding	6—10
Garages	
General	6—10
Repair department	10—15
Glass Works	
Bevelling, decorations, etching, fine grinding, and inspection	15—25
Cutting glass to size, glass-blowing machines, grinding, pressing, and silvering...	6—10
Fine inspection and glass cutting (cut glass)	25—50
Furnace rooms and mixing	4—6
Glove Manufacturing	
Cutting, inspecting,* knitting, pressing, sorting,* stitching, and trimming	15—25
Hat Manufacturing	
Brading, cleaning, dyeing, finishing, flanging, forming, ironing, refining, and stiffening	10—15
Sewing	15—25
Inspection (Colour of light according to requirements)	
Extra Fine	25—50
Fine...	15—25
Medium	10—15
Rough	6—10
Jewellery and Watchmaking	25—50
Leather Manufacturing	
Cleaning, stretching, and tanning ...	4—6
Cutting, fleshing, and stuffing... ...	6—10
Finishing and scarfing	10—15
Vats...	2—4
Leather Working	
Grading and matching* ...	Special lighting
Cutting and scarfing	15—25
Sewing dark materials	25—50
Sewing light materials	15—25
Machine Shops	
Extra fine bench and machine work ...	25—50
Fine automatic machines, fine bench and machine work, fine buffing and polishing, and medium grinding	15—25
Medium bench and machine work, medium buffing and polishing, ordinary automatic machines and rough grinding	10—15
Rough bench and machine work ...	6—10
Paint Shops*	6—10
Paper Box Manufacturing	
Manufacturing	6—10
Storage of stock	4—6
Paper Manufacturing	
Beaters and grinding	6—10
Calendering...	10—15
Cutting, finishing, and trimming ...	15—25
Plating	6—10
Power Houses	
Auxiliary equipment, battery rooms, blowers, boilers, coal and ash handling, compressors, engines, generators, oil switches and transformers, switchboards	6—10
Gauges	Special lighting
Printing Industry	
Casting, matrixing, miscellaneous machines and presses	10—15
Colour printing*	15—25
Electro-typing, lithographing and proof reading	15—25
Imposing, linotype, monotype, stone engraving, and type-setting... ...	25—50
Packing and sorting	6—10
Rubber Manufacturing	
Bead building, calendars, compounding, inner tube operation, mechanical goods, mills fabric preparation, pneumatic tyre building and finishing, solid tyre operations, stock cutting, treading, tubing machines, trimming and vulcanising	6—10
Sheet Metal Works	
Fine bench work, miscellaneous machines, ordinary bench work, presses, punches, shears, stamps, and welders	10—15
Tinplate inspection	15—25
Shoe Manufacturing	
Cutting, hand turning, lasting and welting, miscellaneous bench and machine work	10—15
Inspecting and sorting	15—25
Stitching	25—50
Smiths' Shops	
Fine forging and welding	6—10
Rough forging	4—6

* Installations where artificial daylight may be useful.

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RECOMMENDED ILLUMINATION VALUES

	Foot-candles
Soap Manufacturing	
Cutting, kettle houses, soap chip and powder	4—6
Filling and packing soap powder, stamping, wrapping, and packing	6—10
Steel and Iron Mills (Bar, plate, and wire)	
Automatic machines, rod, light and cold rolling, shearing fine by line, wire drawing	10—15
Casting and charging floors	6—10
Cleaning, heavy rolling, pickling, shearing rough by gauge	4—6
Plate inspection	10—15
Reheating furnaces and soaking pits	2—4
Stores	
Heavy	2—4
Light	6—10
Structural Steel Works	6—10
Sugar Grading	15—25
Sweet Making*	10—15
Testing	
Extra fine instruments, scales, etc	25—50
Fine	10—15
Rough	6—10
Tobacco	
Drying	2—4
Grading and sorting*	15—25
Stripping	6—10
Upholstering	
Automobile, coach, and furniture	10—15
Warehouses	2—4
Welding	10—15
Woodworking	
Cooperage, glueing, medium machine and bench work, planing, rough sanding, sizing, and veneering	10—15
Fine bench and machine working, fine sanding and finishing	15—25

* Installations where artificial daylight may be useful.

The Illuminating Engineering Society is not, as a body, responsible for the opinions expressed by individual authors or speakers.

With a view to avoiding possible confusion with other publications, reference to these Transactions should be in the form:—"Trans. Illum. Eng. Soc. (London)."

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